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| **What will we be learning?****Year 12 biotechnology and Cloning**   | **Why this? Why now?**Previous Learning Future Learning Enquiry ProcessesAnalyse Patterns, Draw conclusions, Present data, Justify opinions, Collect data, Present data, Plan variables | **Key Words:****Clone**AdsorptionAdult Cell CloningBioremediationCallusEmbryo SplittingEntrappingExplantFermenterHorticultureMeritstemMicropropagationMutationNon-reproductive cloningPhenotypePlant Growth regulagtorPlantletReproductive cloningSomatic CellTissue CultureTotipotentTransgenicTriploidUniformityVariationVegetative PropagationSeparationContinuous cultureBatch culture |
| **What will we learn?*** About natural clones in plants and the production of natural clones for use in horticulture
* How to take plant cuttings as an example of a simple cloning technique
* How to roduce artificial clones of plants by micropropagation and tissue culture
* The arguments for and against artificial cloning in plants
* How artificial clones in animals can be produced by artificial embryo twinning or by enucleation and somatic cell nuclear transfer (SCNT) and the arguments for and against artificial cloning in animals
* The use of microorganisms in biotechnological processes and the advantages and disadvantages of using microorganisms to make food for human consumption
* How to culture microorganisms effectively, using aseptic techniques and the importance of manipulating the growing conditions in batch and continuous fermentation in order to maximise the yield of product required
* The standard growth curve of a microorganism in a closed culture
* Practical investigations into the factors affecting the growth of microorganisms
* The uses of immobilised enzymes in biotechnology and the different methods of immobilisation.

**Misconceptions in this topic** |
| **What opportunities are there for wider study?**CareersAgriculture Biochemistry Biotechnology Brewing Food Science Forensics Horticulture Laboratory Work Medicine Pharmacology Teaching STE(A)M https://highcliffe.sharepoint.com/sites/LearnSTEM |
| **How will I be assessed?**End of topic assessment  |